Name:

at1121exam_practice: Radicals and Squares (v620)

Question 1

Simplify the radical expressions.

$$\sqrt{28} \qquad\qquad\qquad \sqrt{99} \qquad\qquad\qquad \sqrt{18}$$

$$\sqrt{2 \cdot 2 \cdot 7} \qquad\qquad \sqrt{3 \cdot 3 \cdot 11} \qquad\qquad \sqrt{3 \cdot 3 \cdot 2}$$
$$2\sqrt{7} \qquad\qquad\qquad 3\sqrt{11} \qquad\qquad\qquad 3\sqrt{2}$$

Question 2

Find all solutions to the equation below:

$$\frac{(x-10)^2}{6} - 7 \;=\; -1$$

First, add 7 to both sides.
$$\frac{(x-10)^2}{6} = 6$$

Then, multiply both sides by 6.
$$(x-10)^2 = 36$$

Undo the squaring. Remember the plus-minus symbol.

$$x - 10 = \pm 6$$

Add 10 to both sides.
$$x = 10 \pm 6$$

So the two solutions are $x = 16$ and $x = 4$.

Question 3

By completing the square, find both solutions to the given equation. *You must show work for full credit!*

$$x^2 - 8x = 9$$

$$x^2 - 8x + 16 = 9 + 16$$
$$x^2 - 8x + 16 = 25$$
$$(x - 4)^2 = 25$$
$$x - 4 = \pm 5$$
$$x = 4 \pm 5$$
$$x = 9 \qquad \text{or} \qquad x = -1$$

Question 4

A quadratic polynomial function is shown below in standard form.

$$y = 4x^2 + 40x + 97$$

Express the function in **vertex form** and identify the **location** of the vertex.

From the first two terms, factor out 4 .
$$y = 4(x^2 + 10x) + 97$$

We want a perfect square. Halve 10 and square the result to get 25 . Add and subtract that value inside the parentheses.
$$y = 4(x^2 + 10x + 25 - 25) + 97$$

Factor the perfect-square trinomial.
$$y = 4((x + 5)^2 - 25) + 97$$

Distribute the 4.
$$y = 4(x + 5)^2 - 100 + 97$$

Combine the constants to get **vertex form**:

$$y = 4(x + 5)^2 - 3$$

The vertex is at point $(-5, -3)$.